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AIR QUALITY BUREAU PROCEDURE

Effective Date: May 14, 2003	**Procedure Number: AQB 02-001.01**

Title: Concrete batch plants - revised method of estimating emissions

Reference: 20.2.72 NMAC

PURPOSE: To describe a realistic method of determining emissions from concrete batch plants, based upon accepted EPA and industry-based calculations and experience.

POINT OF CONTACT: NSR Permit Program Manager

1.0 DISCUSSION: The Department has developed a method to determine emissions from concrete batch plants based upon EPA research and calculations.

In evaluating emissions from concrete batch plants, the Department uses emissions factors from the US EPA's list of factors in AP-42.   Prior to November 1991, the Department reviewed concrete batch plants using AP-42 emissions factors from Sections 8.10, Concrete Batching (October, 1986 version). In January of 1995, AP-42 was reformatted and Section 8.10 became 11.12.

For the purposes of the following example calculations, it is assumed that one cubic yard of concrete weighs approximately 4024 pounds and consists of 1428 pounds of sand, 1865 pounds of aggregate, 491 pounds of cement, 73 pounds of supplement and 160 pounds of water. The sand and aggregate is washed and cleaned for use in concrete mix. The process rate used in these calculations is **100 cubic yards per hour (201 tons per hour)** and the moisture content for the sand and aggregate is assumed to be 4.17% and 1.17% respectively. Calculations for individual facilities must be adjusted for the correct plant capacity.

2.0 Example Calculation for an Acceptable Method of Estimating Emissions using AP-42 Section 11.12: The New Mexico AQB uses AP-42 guidance in section 11.12 (October 2001) for estimating uncontrolled emissions for a concrete batch plant.

A. Sand and aggregate transfer to elevated bin:

The emissions factors used in this section, A, were derived as those in AP-42 11.12, but with a mean wind speed of 15 mph instead of 10 mph. This wind speed is consistent with the value that the Bureau uses for crusher spreads and asphalt plants.

A.1 Sand transfer

Typical Sand Content (pounds per cubic yard) / 2000 (pounds per ton) X Process rate (Cubic Yards per hour) = Sand transfer rate (tons per hour)

$\frac{(1428 \text{ lb./cu. yd})}{2000 \text{ lb/ton}}$ X 100 cu. yd/hr = 71.4 tph transferred

Sand transfer rate (tons per hour) X Emission Factor (lb particulate per ton) = Emission Rate (pounds per hour)

71.4 tph X 0.0035 lb particulate emissions/ton = **0.25 pph** of particulate emissions

A.2 Aggregate transfer

$\frac{(1865 \text{ lb/cu. yd})}{2000 \text{ lb/ton}}$ X 100 cu. yd/hr = 93.25 tph transferred

93.25 tph X 0.0117 lb particulate emissions/ton = **1.09 pph** of particulate emissions

B. Silo loading

One characteristic typical of all concrete batch plants, regardless of the production capacity, is the storage silos can only be loaded at a rate of approximately 25 tons per hour. This is because the supply trucks can only carry 25 tons at one time, and take one hour to connect the equipment, complete the transfer, disconnect the equipment, and remove the truck from the loading area.

B.1 Cement unloading to storage silo (pneumatic):

(25 tph of cement unloaded)

25 tph X 0.72 lb particulate emissions/ton = **18 pph** of particulate emissions

B.2 Supplementary material (fly ash, etc.) unloading to storage silo (pneumatic)

25 tph X 3.14 lb particulate emissions/ton = **78.5 pph** of particulate emissions

C. Weigh hopper loading (based on sand and aggregate process rates):

$\underline{(1428 \text{ lb/cu. yd} + 1865 \text{ lb/cu. yd})}$ X 100 yd^3/hr =165 tph loaded

2000 lb/ton

165 tph X 0.0051 lb particulate emissions/ton = **0.84 pph**
of particulate emissions

D. Truck loading (based on cement and supplement process rates):

$$\frac{(491 \text{ lb/cu. yd} + 73 \text{ lb/cu. yd})}{2000 \text{ lb/ton}} \text{ X } 100 \text{ yd}^3/\text{hr} = 28.2 \text{ tph loaded}$$

28.2 tph X 0.61 lb particulate emissions/ton = **17.2 pph**
of particulate emissions

E. Wind erosion from storage piles:

The emission factor used in this section, E, was obtained from the pertinent section(s) of AP-42, 11.12 (October 1986).

$$\frac{3.5 \text{ lb/acre/day particulate emissions}}{24 \text{ hrs/day}} = \quad \textbf{0.15 pph/acre}$$
of particulate emissions

F. Total of A, B, C, D above:

To obtain the total uncontrolled emissions in a year, multiply the total per hour by 8760 hours per year and divide by 2000 pounds per ton.

For the example: 0.25 pph + 1.09 pph + 18.0 pph + 78.5 pph + 0.84 pph + 17.2 pph = 115.88 pph
(115.88 pph * 8760 hrs/yr)/2000 lbs/ton = 507.6 tons/yr

Since this is above the construction permitting threshold of 10 pph and also 25 tons per year, this plant would require a construction permit prior to construction and operation.

3.0 EMISSIONS CONTROLS: Loading of concrete and fly ash silos is the greatest source of emissions from batching plants. Emissions are typically controlled by the use of fabric filters or baghouses. Efficiencies of these emission controls range from 80% for fabric filters, to 95% for baghouses. Fabric filters and baghouses must receive good and routine maintenance to obtain the desired efficiency rates.

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Bureau Chief   Date